

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

**1. Work request WCC fills out this section.**

☐ Standing Work Permit

Requester: Robert Pisani	Date: 7/27/2016	Ext.: 5301	Dept/Div/Group: PO
Other Contact person (if different from requester): Carter Biggs			Ext.:
Work Control Coordinator: Don Lynch		Start Date:	Est. End Date: 11/1/2016
Brief Description of Work: Removal Of RICH Vessel (east and west) from PHENIX as part of the PHENIX Removal \$ Repurposing Plan			
Building: 1008	Room: IR and Assembly Area	Equipment: PHENIX RICH Detectors	Service Provider: PHENIX Techs, Engineers, Subsystem experts, PHENI Electricians, C-A Carpenters and Riggers

**2. WCC, Requester/Designee, Service Provider, and ESSH (as necessary) fill out this section or attach analysis**

<b>ESSH ANALYSIS</b>							
<b>Radiation Concerns</b>	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination	<input checked="" type="checkbox"/> Radiation	<input type="checkbox"/> NORM	<input type="checkbox"/> Other
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group				<input type="checkbox"/> Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer			
<b>Radiation Generating Devices:</b>	<input type="checkbox"/> Radiography		<input type="checkbox"/> Moisture Density Gauges		<input type="checkbox"/> Soil Density Gauges		<input type="checkbox"/> X-ray Equipment
<b>Safety and Security Concerns</b>	<input type="checkbox"/> None		<input type="checkbox"/> Explosives		<input type="checkbox"/> Transport of Haz/Rad Material		<input type="checkbox"/> Pressurized Systems
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Critical Lift		<input type="checkbox"/> Fumes/Mist/Dust*		<input type="checkbox"/> Magnetic Fields*		<input type="checkbox"/> Railroad Work
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic		<input type="checkbox"/> Heat/Cold Stress		<input type="checkbox"/> Nanomaterials/particles*		<input checked="" type="checkbox"/> Rigging
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical		<input type="checkbox"/> Hydraulic		<input type="checkbox"/> Noise*		<input type="checkbox"/> Silica*
<input type="checkbox"/> Biohazard*	<input checked="" type="checkbox"/> Elevated Work		<input type="checkbox"/> Lasers*		<input type="checkbox"/> Non-ionizing Radiation*		<input type="checkbox"/> Security Concerns
<input type="checkbox"/> Chemicals/Corrosives*	<input type="checkbox"/> Excavation		<input type="checkbox"/> Lead*		<input type="checkbox"/> Oxygen Deficiency*		<input type="checkbox"/> Suspect/Counterfeit Items
<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Ergonomics*		<input type="checkbox"/> Material Handling		<input type="checkbox"/> Penetrating Fire Walls		<input type="checkbox"/> Vacuum
Ladder Access Required: <input checked="" type="checkbox"/> Portable Ladder <input type="checkbox"/> Fixed Ladder- Status/Restrictions:							
* Safety Health Rep. Review Required		<input type="checkbox"/> Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM				<input type="checkbox"/> Other	
<b>Environmental Concerns</b>			<input checked="" type="checkbox"/> None		<input type="checkbox"/> Work impacts Environmental Permit No.		
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad/GHG)		<input type="checkbox"/> Land Use Institutional Controls		<input type="checkbox"/> Soil Activation/contamination		<input type="checkbox"/> Waste-Mixed	
<input type="checkbox"/> Chemical or Rad Material Storage or Use		<input type="checkbox"/> Liquid Discharges		<input type="checkbox"/> Waste-Clean		<input type="checkbox"/> Waste-Radioactive	
<input type="checkbox"/> Cesspools (UIC)		<input type="checkbox"/> PCB Management		<input type="checkbox"/> Waste-Hazardous		<input type="checkbox"/> Waste-Regulated Medical	
<input type="checkbox"/> High water/power consumption		<input type="checkbox"/> Spill potential		<input type="checkbox"/> Waste-Industrial		<input type="checkbox"/> Historical Environmental Hazards	
Waste disposition by: <input type="checkbox"/> Other							
Pollution Prevention (P2)/Waste Minimization Opportunity: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				Environmental Preferable Products Available: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes			
<b>FACILITY CONCERNS</b>		<input checked="" type="checkbox"/> None		<input type="checkbox"/> Intermittent Energy Release			
<input type="checkbox"/> Access/Egress Limitations		<input type="checkbox"/> Electrical Noise		<input type="checkbox"/> Potential to Cause a False Alarm		<input type="checkbox"/> Vibrations	
<input type="checkbox"/> Credited Controls (Use USI Process)		<input type="checkbox"/> Impacts Facility Use Agreement		<input type="checkbox"/> Temperature Change		<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Management		<input type="checkbox"/> Maintenance Work on Ventilation Systems		<input type="checkbox"/> Utility Interruptions			
<b>WORK CONTROLS</b>							
<b>Work Practices</b>							
<input type="checkbox"/> None		<input type="checkbox"/> Exhaust Ventilation		<input checked="" type="checkbox"/> Lockout/Tagout		<input type="checkbox"/> Spill Containment	
<input type="checkbox"/> Back-up Person/Watch		<input checked="" type="checkbox"/> HP Coverage		<input type="checkbox"/> Posting/Warning Signs		<input type="checkbox"/> Time Limitation	
<input checked="" type="checkbox"/> Barricades		<input type="checkbox"/> IH Survey		<input type="checkbox"/> Scaffolding-requires inspection		<input type="checkbox"/> Warning Alarm (i.e. "high level")	
						<input type="checkbox"/> Electrical Inspection Required	
<b>Personal Protective Equipment</b>							
<input type="checkbox"/> None		<input type="checkbox"/> Ear Plugs		<input checked="" type="checkbox"/> Gloves, as necessary		<input type="checkbox"/> Lab Coat	
<input type="checkbox"/> Coveralls		<input type="checkbox"/> Ear Muffs		<input type="checkbox"/> Goggles		<input type="checkbox"/> Respirator*	
<input type="checkbox"/> Disposable Clothing		<input type="checkbox"/> Face Shield		<input checked="" type="checkbox"/> Hard Hat, As required		<input type="checkbox"/> Shoe Covers	
				<input checked="" type="checkbox"/> Safety Shoes, as req'd		<input type="checkbox"/> High visibility cloths/vest	
						<input type="checkbox"/> Other	
<b>Permits Required</b> (Permits must be valid when job is scheduled.)							
<input checked="" type="checkbox"/> None		<input type="checkbox"/> Cutting/Welding		<input type="checkbox"/> Impair Fire Protection Systems			
<input type="checkbox"/> Concrete/Masonry Penetration		<input type="checkbox"/> Digging/Core Drilling		<input type="checkbox"/> Rad Work Permit-RWP No			
<input type="checkbox"/> Confined Space Entry		<input type="checkbox"/> Electrical Working Hot		<input type="checkbox"/> Other			
<b>Dosimetry/Monitoring</b>							
<input checked="" type="checkbox"/> None		<input type="checkbox"/> Heat Stress Monitor		<input type="checkbox"/> Real Time Monitor		<input checked="" type="checkbox"/> TLD in Bldg 912	
<input type="checkbox"/> Air Effluent		<input type="checkbox"/> Noise Survey/Dosimeter		<input type="checkbox"/> Self-reading Pencil Dosimeter		<input type="checkbox"/> Waste Characterization	
<input type="checkbox"/> Ground Water		<input type="checkbox"/> O <sub>2</sub> /Combustible Gas		<input type="checkbox"/> Self-reading Digital Dosimeter		<input type="checkbox"/> Other	
<input type="checkbox"/> Liquid Effluent		<input type="checkbox"/> Passive Vapor Monitor		<input type="checkbox"/> Sorbent Tube/Filter Pump			
<b>Training Requirements</b> (List specific training requirements)							
PHENIX Awareness, C-A Access, Working at Heights (where needed), Electrical Safety 1, LOTO where needed							
<b>Work screening has identified the following as the reason for permitted work:</b>				<b>When work is categorized as worker planned work and a permit is used only the following signatures are required: ( Although allowed, there is no need to use back of form)</b>			
<input type="checkbox"/> ESSH				WCC: _____ Date: _____			
<input type="checkbox"/> Complexity				Service Provider: _____ Date: _____			
<input checked="" type="checkbox"/> Work Coordination				Authorization to start: _____ Date: _____			
<input type="checkbox"/> Permit Not Required (Sections 3 through 7 optional)				(Department/Division, or their equivalent, Sup/WCC/Designee)			

### 3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

**Work Plan** (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail): During the 2016 PHENIX R&R Shutdown, PHENIX will be performing R&R work to prepare for a new sPHENIX detector. As part of this effort, it is required that the RICH detector subsystems (east and west) be removed and disposed of safely at 1008. Most of this work will be worker planned work by skilled PHENIX technicians and appropriately trained BNL bargaining unit personnel. An attachment is included visually illustrating the removal of the RICH to aid in the process. The Vessel will then be shipped to Building 912 by CA-Riggers.

Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)

Notifications to operations and Operational Limits Requirements:

Post Work Testing, Notification or Documentation Required:

Job Safety Analysis Required: ☐ Yes ☒ No

Review Done: ☒ in series ☐ team

**Reviewed by:** \* Primary Reviewer signature (not required for Worker Planned Work) means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator	Don Lynch		20146	
Safety Health Representative				
Research Space Manager				
Other				
Other				
Required Walkdown Completed				
*Primary Reviewer				

### 4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Job Supervisor: Carter Biggs		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ESSH concerns or on ideas for improved job work flow. Use feedback form or space below.

### 5. Department/Division, or their equivalent, Line Manager or Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

Name:	Signature:	Life#:	Date:
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### 6. Worker provides feedback.

**Worker Feedback (use attached sheets as necessary)**

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

### 7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.)

Name:	Signature:	Life#:	Date:
Comments:			

## **Introduction**

Safe handling of the RICH Assembly while removing from the PHENIX Detector Carriage will eliminate danger to workers at Brookhaven National Laboratory (BNL). This procedure will provide detailed instructions for safe removal of the detector assembly from the PHENIX East and West Carriages.

## **1.0 Purpose & Scope**

The purpose of this procedure is to provide directions for handling and removing the RICH Assembly. It applies to BNL personnel, outside contractors, contract labor and to personnel designated to operate equipment covered by this procedure. Safety standards provided by BNL for Material Handling (1.6.0) and required training and certification (1.6.1) will apply. There are two parts to the procedure: The lift of the detector assembly off the Detector Carriage, and movement of the detector assembly from the assembly hall floor to the truck for transportation to building 912. This procedure will be used for the removal of the two RICH assemblies: one on the East Carriage, and one on the West carriage.

## **2.0 Responsibilities**

2.1 All operations shall be performed under the direction of the PHENIX Experimental Hall "Person-in-Charge" or his designee.

2.2 Due to the component value, as well as the inherent personnel risk involved in handling such large objects, this procedure and all relevant BNL safety guidelines must be strictly adhered to. In accordance with BNL policy, any individual may cease operations if they in any way feel unsafe or if they believe unsafe procedures are being followed. Such a complaint shall be reviewed by the cognizant engineer, and if necessary, BNL ES & H Services.

## **3.0 Prerequisites**

3.1 All personnel involved in this procedure shall wear hard hats.

3.2 Personnel involved in this procedure shall wear safety shoes.

3.3 Personnel involved in this procedure shall wear safety glasses

## **4.0 Precautions**

4.1 Visitors shall not be permitted in the PEH during these procedures.

4.2 Some operations will require personnel to work in close proximity to suspended loads. Do not permit yourself or anyone else to be positioned under the load.

## **5.0 Equipment/Parts List**

5.1 Equipment and parts needed are listed on section 4.0 of Procedure PP-2.5.5.4-.01 (RICH Installation Procedure) which is attached.

## **6.0 Preparations**

***Note: All lifting hardware shall be checked for current inspection stickers and shall be visually inspected for defects prior to each lift. Any items found to have expired inspection tags or any evidence of physical degradation shall be immediately removed from service and replaced with conforming hardware of the same capacity.***

6.1 Disconnect and remove all cables, gas, and water lines from RICH detector.

6.2 Racks and platforms on E3 and E2 will be removed prior to removing RICH detector.

*FLORIDA STATE UNIVERSITY  
NUCLEAR PHYSICS DEPARTMENT*

**RICH PROJECT**

**GAS VESSEL HANDLING:  
VESSEL TRANSPORT FROM 832  
TO 1008  
FSU-RP-P08**

**Florida State University  
Tallahassee, FL 32306  
(850)644 -4100**

# **GAS VESSEL HANDLING: Transport and loading Procedures**

## **CONTENTS**

- I. INTRODUCTION**
- II. SCOPE**
- III. RESPONSIBILITIES**
- IV. PRE TRANSPORT AND LOADING PROCEDURE**
- V. TRANSPORT PROCEDURE**

## I. INTRODUCTION

This procedure is for the safe handling of the Rich Gas Vessel while transporting the rich gas vessel from building 832 to building 1008

## II. SCOPE

This procedure gives the minimum requirements for moving the gas vessel from building 832 to building 1008. Lifting the vessel on the transport truck with the appropriate cranes and lifting gear. It applies to BNL personnel, outside contractors, contract labor and to personnel designated to operate equipment covered by this procedure. Safety standards provided by BNL for Material Handling (1.6.0), Required training and certifications (1.6.1), DOE -STD-1090-96 (REV1) sec 3.3, 3.4 will apply to this procedure.

## III. RESPONSIBILITY

1. Florida State University (FSU): A qualified representative of FSU will be on site as a consultant during the following operations
2. BNL: BNL will provide appropriate personnel for hoisting, rigging, crane operation, line supervision, and the appropriate equipment with verifications for the following operation:

Equipment BNL should provide:

Crane hook in building 832, rated for 25,000 lb Min.

Two 12' long slings rated for 25,000 LB min (to lift gas vessel).

Two 10,000 lb. chain falls (to lift gas vessel).

Hardware to connect slings to crane hook.

Shackles rated 20,000 min.

Spreader bar rated for 15 ton min.

Flat bed truck.

Escort for move.

#### **IV. PRE-TRANSPORT AND LOADING PROCEDURE**

1. Position blocks and steel plates on truck bed (fig 3).
2. Vessel should be in the park position (fig 1).
3. Move crane into position to pick up spreader bar with 12-ft slings and chainfalls attached to lift points.
4. Move spreader bar to central position above vessel, lower to Attach 12' slings and chainfalls to ends of vessel lift frame (fig 1).
5. Attach tag lines to vessel lift frame.
6. Begin lift, when vessel and frame are clear of stands move to the north end of tent adjust chain falls to correct angle (fig 2).
7. Back truck into building 832 under vessel.
8. Lower vessel and frame on to truck tie down frame and vessel to truck bed (fig 3).
9. Remove slings from frame pick points.

#### **V. TRANSPORT PROCEDURE**

1. Pull truck out of building 832.
2. Transport spreader bar to 1008.
3. Drive truck with escorts on predetermined route to building 1008.
4. Back truck down to 1008 and through doors (Fig 4).
5. For unloading in 1008 use procedure PHENIX No PP-2.5.5.4/01

FIG. 1

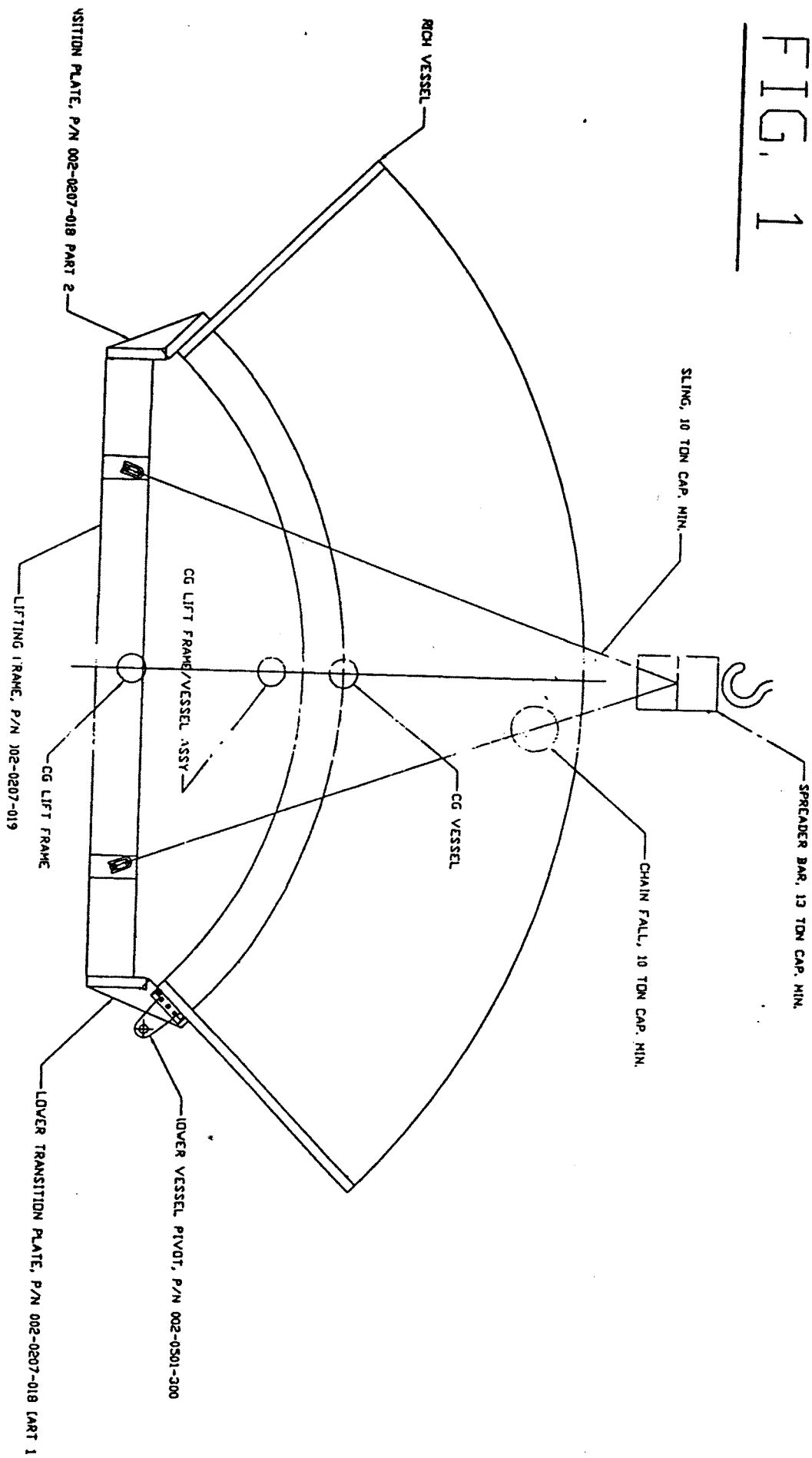
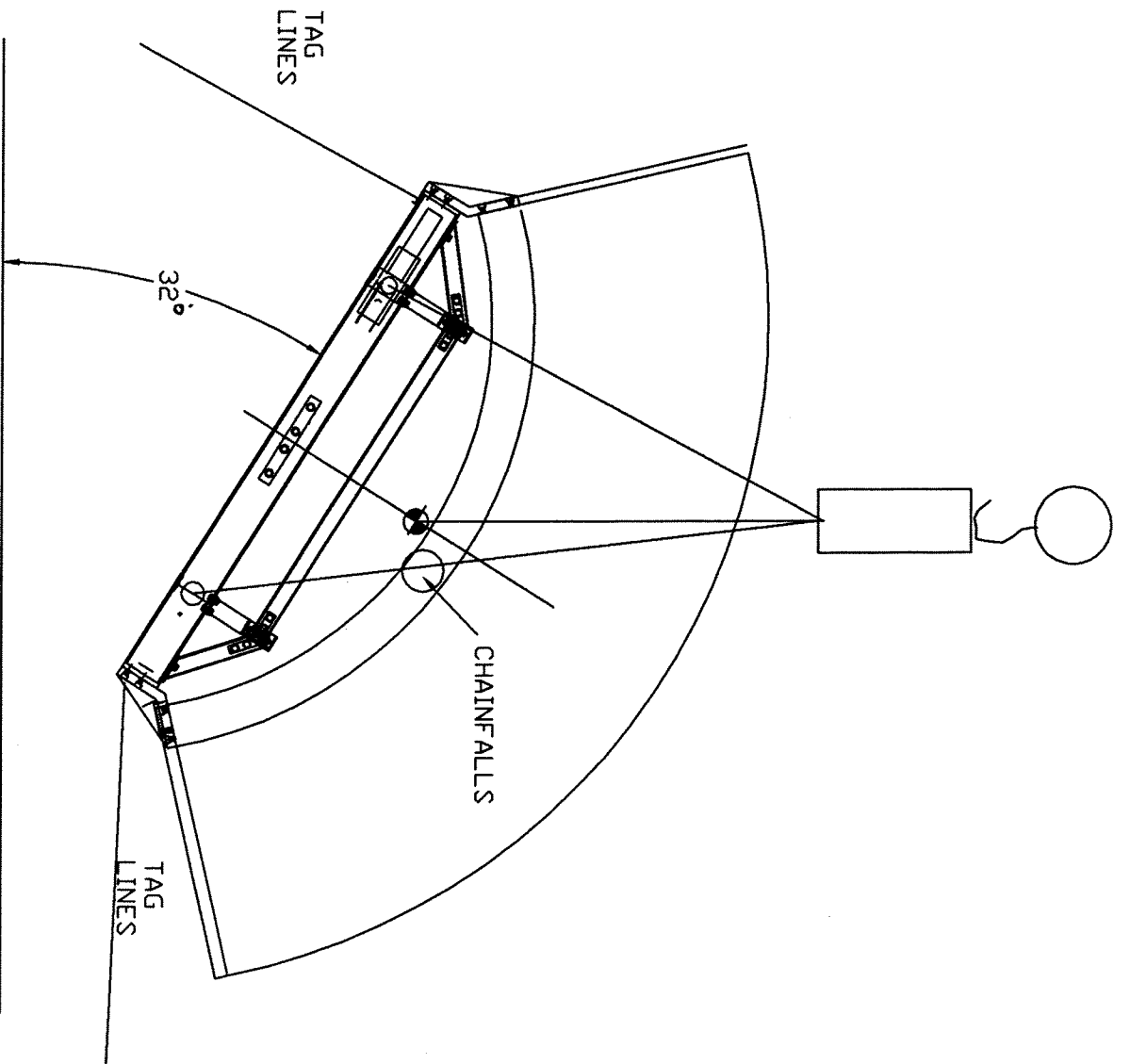


Fig 2



TOTAL LOAD ON TRUCK  
58500 LBS

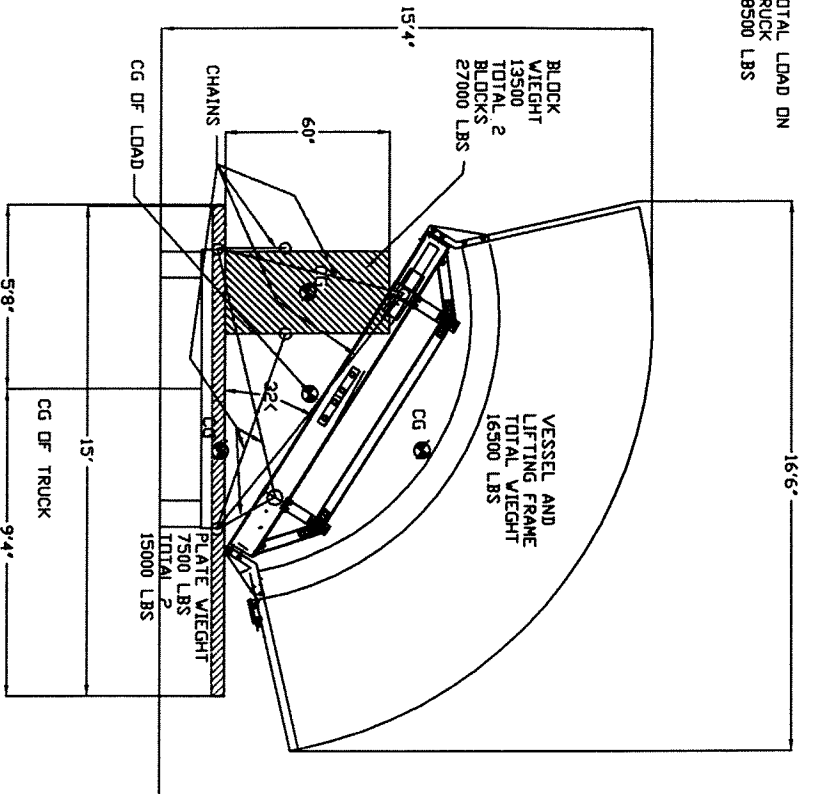
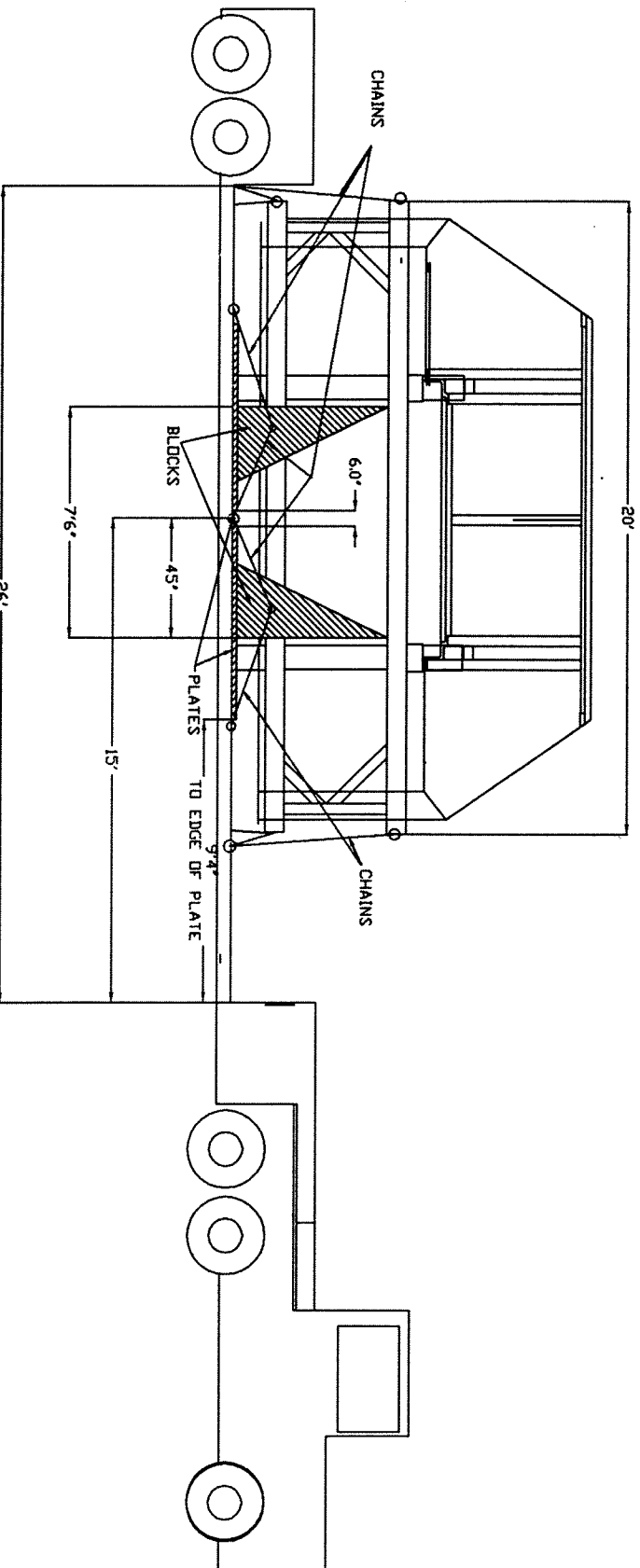


Fig 3



-210.0000 -  
(17'6")





RICH INSTALLATION PROCEDURE

procedure name

PHENIX Procedure No. PP-2.5.5.4-01

Revision: B

Date: 10-28-98

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approvals

W. Stokes 10/28/98  
PHENIX S E & I Date

[Signature] 10/28/98  
Cognizant Scientist/Engineer Date  
/Activity Manager

W. M. Cahan 10/29/98  
PHENIX QA/Safety Date

[Signature] 11/24/98  
RHIC ES&H Date

## **RICH Installation Procedure**

### **1.0 Purpose and Scope**

This document shall describe the method of safely installing the RICH detector onto the PHENIX detector carriage. It shall describe steps following the delivery of the vessel through the roll-up entry door to building 1008.

### **2.0 Responsibilities**

Only trained and authorized BNL technicians and/or riggers shall perform the tasks described herein under the supervision of the building 1008 PIC and/or lead rigger.

### **3.0 Prerequisites**

- 3.1 All persons performing tasks described herein shall possess a current BNL Safety Awareness Certificate (SAC).
- 3.2 All persons performing tasks described herein shall possess current training certifications for equipment used per BNL ES&H standard 1.6.0.
- 3.3 All persons performing tasks described herein shall wear proper personal protective equipment per BNL ES&H standard 1.16.0.
- 3.4 All materials handling equipment used shall have been maintained and inspected per BNL ES&H standard 1.6.0.

### **4.0 Required Equipment**

- 4.1 Two Pivot Pins, P/N 002-0501-303
- 4.2 Four Insulating Washers, P/N 002-0501-304
- 4.3 Two ½-13x1" long socket set screws, BNL Stock No T-64260

## RICH Installation Procedure

- 4.4 Six 10' long slings rated 10 Tons
- 4.5 Four chain falls rated 5 Tons (20 feet long min.)
- 4.6 40 ton building crane
- 4.7 Four shackles rated 10 Tons
- 4.8 One spreader bar, Rated 13 Tons. min. x approx. 20 feet long
- 4.9 Two vessel stabilizing bars, P/N 002-0207-082
- 4.10 Two swivel shackles rated 2.5 tons min.
- 4.11 Two come-alongs rated 1 ton min.

### **5.0 Procedure**

- 5.1 The RICH vessel shall arrive from building 832 assembly area fitted with the following equipment:
  - 5.1.1 RICH lifting frame, P/N 002-0207-019
  - 5.1.2 Two upper transition plates, P/N 002-0207-018 Part 2
  - 5.1.3 Two lower vessel pivots, P/N 002-0501-300
  - 5.1.4 Two lower transition plates, P/N 002-0207-081
- 5.2 Hang the spreader bar from the 40 ton crane hook at a convenient height and attach two slings (one full length and one doubled for half length) to each end. Attach a chain fall to each sling.

## RICH Installation Procedure

- 5.3 Raise the spreader bar above the RICH vessel and attach the chain falls connected to the doubled slings to the lifting frame's swivel shackles nearest the vessel top, attach the other two chain falls to the lifting frame's swivel shackles nearest the vessel bottom. See Fig. 1.
- 5.4 Adjust the chain falls to the proper length to position the spreader bar over the vessel's center of gravity. (Fig. 1)
- 5.5 Lift the vessel, move it to the PHENIX detector carriage, and align the holes of the vessel and carriage pivot mounts.
- 5.6 Install the pivot pins (P/N 002-0501-303) through the holes in the pivots and one insulating washer (P/N 002-0501-304) in each space between the male and female pivot.
- 5.7 Lock each pivot pin in place with one 1/2-13x1" long set screw (BNL stock # T-64260).

**NOTE:** The following three steps are an alternate to and replace the prior three steps (5.5, 5.6, 5.7) if the pivot pin cannot be engaged while the vessel is suspended from the crane.

5.5A Remove the carriage pivots (002-0501-301) from the carriage and install them, the insulating washers (002-0501-304), the pivot pins (002-0501-303) and the 1/2-13 set screws onto the vessel pivots (002-0501-300) on the vessel.

5.6A Move the vessel to the detector carriage and align the carriage pivot mounting holes with the pivot mounting plate holes.

5.7A Install five 1"-8 socket head cap screws (omit the top center bolt directly covered by the pivot pin) to fasten each pivot to the carriage.

## **RICH Installation Procedure**

- 5.8 While maintaining the vessel's position with the crane, relieve tension on the chain falls nearest the pivots transferring the full load to the chain falls nearest the vessel top.
- 5.9 Remove the chain falls nearest the pivots from the lifting frame and spreader bar and secure the long slings from dangling freely.
- 5.10 Relocate chain falls to have one end attached to slings looped around the upper transition plates and one end anchored to the bottom of the carriage tracks or swivel shackle (2.5 ton) bolted to the floor. The distance from the front of the carriage to this anchor point must be a minimum of 20 feet to maintain an angle  $<45^\circ$  between the chain fall and the floor when the vessel is near vertical. See Fig. 2
- 5.11 Slowly raise the vessel with the crane while, simultaneously lengthening the chain falls until the vessel rests upon the rear mounts.

### **CAUTION**

Do not allow chain falls to become slack. This will cause a rapid movement of the vessel and shock loading as its center of gravity passes over the pivots.

- 5.12 Stabilize the vessel with two come-alongs each having one end anchored to the vessel and one to the carriage crossbar.
- 5.13 Remove chain falls from the transition plates and floor anchor.
- 5.14 Reinstall the chain falls to their original position from the spreader bar to the lifting frame's lower swivel shackles. See Fig. 3.
- 5.15 Position the spreader bar over the lifting frame center of gravity (CG)
- 5.16 Tighten chain falls to assume the load.

## **RICH Installation Procedure**

- 5.17 Attach tag lines to the lower end of the lifting frame.
- 5.18 Remove the bolts attaching the upper transition plates to the vessel.
- 5.19 Carefully remove the bolts attaching the lower transition plates to the vessel pivot.

### **CAUTION**

Removing these bolts will allow the lifting frame to swing free of the vessel. Control the swing of the frame with tag lines and the crane to prevent harm to personnel and to prevent damage to the RICH window.

- 5.20 Remove the come-alongs stabilizing the vessel.
- 5.21 Install stabilizing bars (P/N 002-0207-082) to top of vessel.

## **6.0 References**

- 6.1 BNL ES&H Standard 1.6.0
- 6.2 BNL ES&H Standard 1.16.0
- 6.3 Pivot Pin Drawing 002-0501-303
- 6.4 Insulating Washer Drawing 002-0501-304
- 6.5 RICH Lifting Frame Drawing 002-0207-019
- 6.6 Upper Transition Plate Drawing 002-0207-018 Part 2
- 6.7 Lower Transition Plate Drawing 002-0207-081
- 6.8 Vessel Pivot Drawing 002-0501-300

## RICH Installation Procedure

6.9 Vessel Stabilizing Bar Drawing 002-0207-082

6.10 Detector Carriage Assembly Drawings, 002-0501-001 &  
002-0501-002.

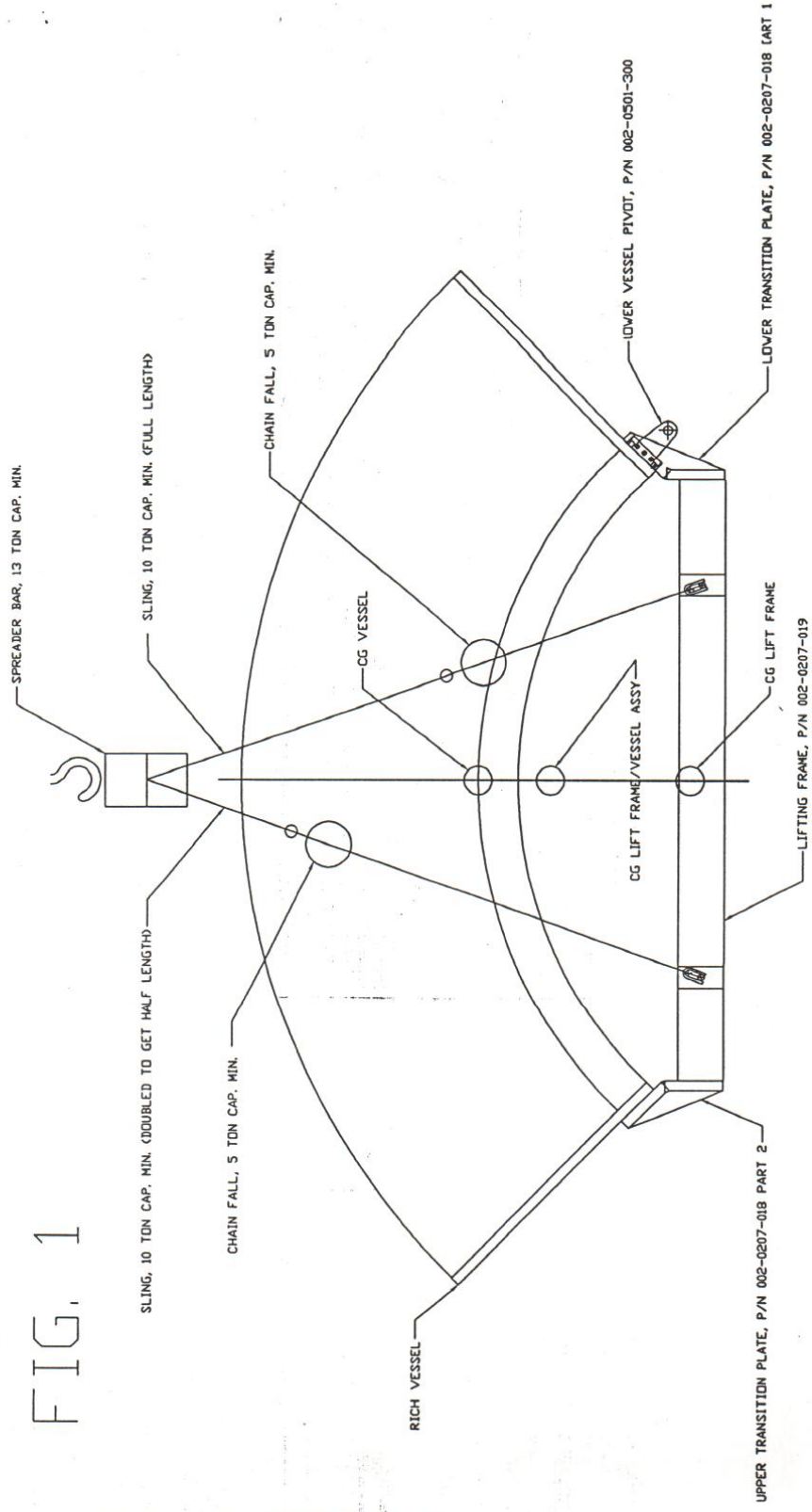
6.11 Carriage Pivot Drawing 002-0501-301

### 7.0 Attachments

7.1 Drawings  
002-0501-001  
002-0501-002  
002-0501-300  
002-0501-301  
002-0501-303  
002-0501-304  
002-0207-018  
002-0207-019  
002-0207-081  
002-0207-082

7.2 Figures 1 through 3

FIG. 1



SPREADER BAR, 13 TON CAP. MIN.

FIG. 2

RICH VESSEL

SLING, 10 TON CAP. MIN.

CHAIN FALL 2.5 TON MIN.

SLING, 2.5 TON CAP. MIN.

CHAIN FALL, 2.5 TON CAP MIN.

CG LIFT FRAME/VESSEL ASSY

CG RICH VESSEL

CG LIFT FRAME

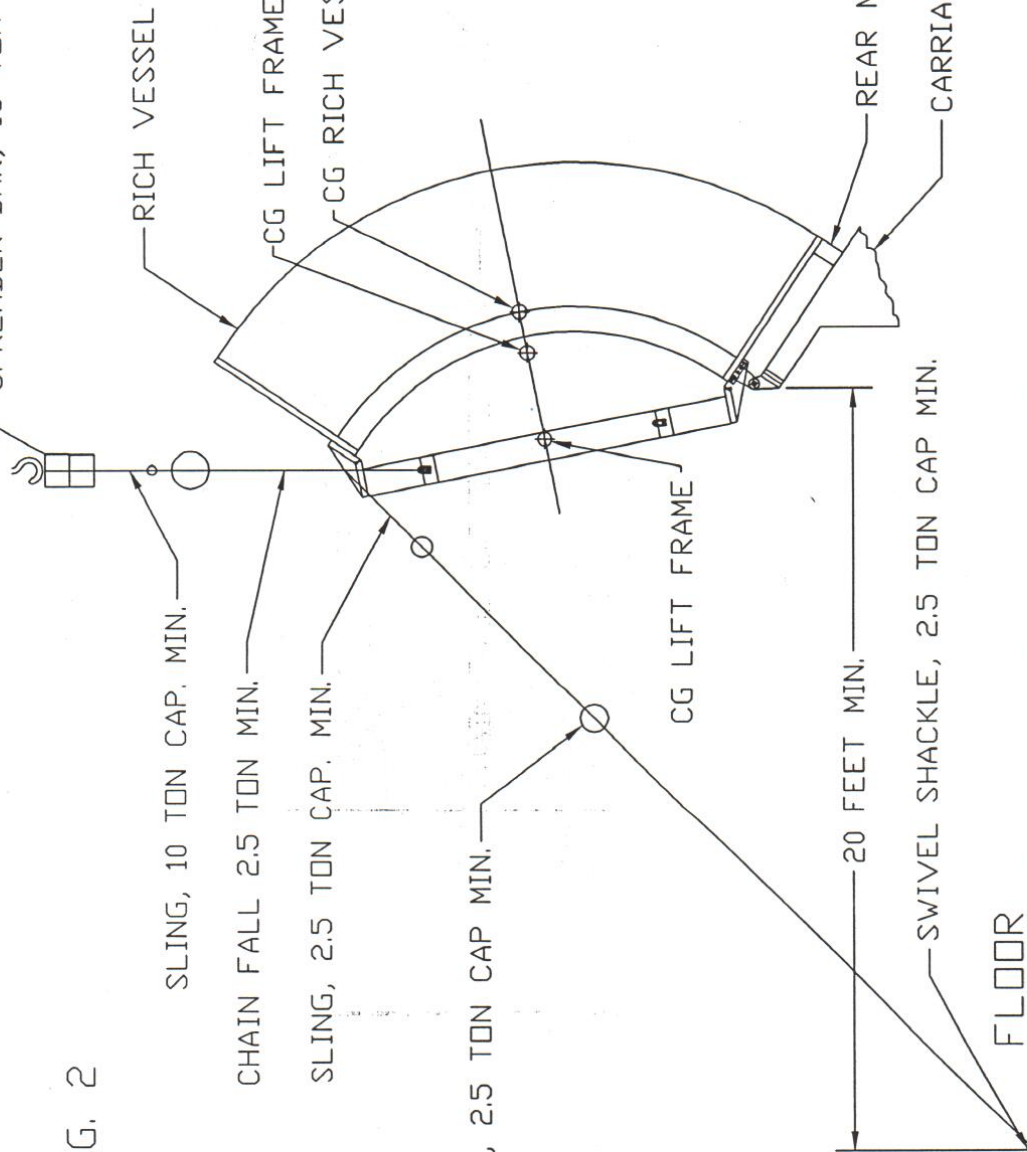
REAR MOUNT

SWIVEL SHACKLE, 2.5 TON CAP MIN.

FLOOR

20 FEET MIN.

CARRIAGE ARM



SPREADER BAR, 13 TON CAP. ON.

FIG. 3

CHAIN FALL, 5 TON MIN.

SLING, 10 TON CAP. MIN.

RICH VESSEL

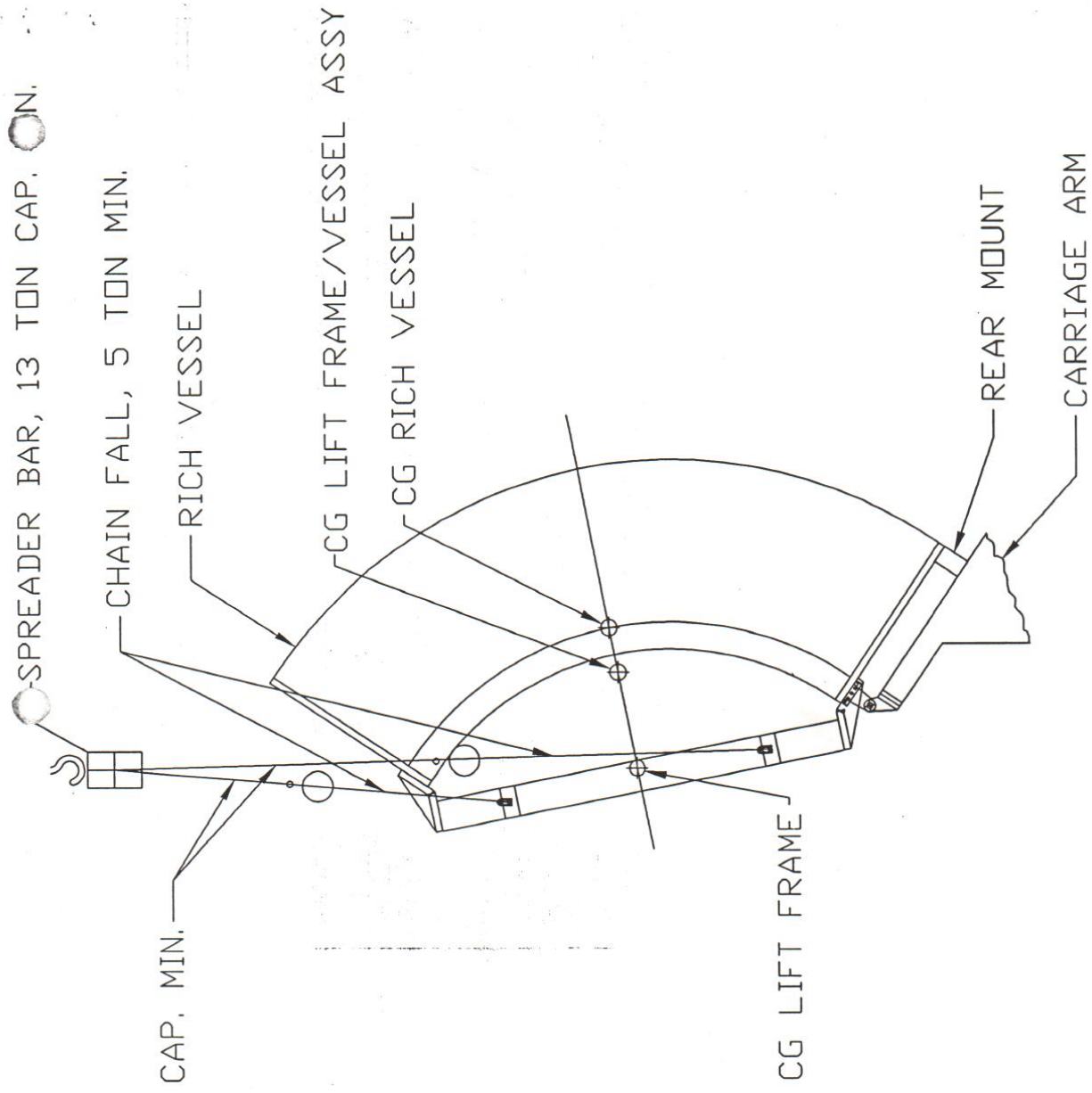
CG LIFT FRAME/VESSEL ASSY

CG RICH VESSEL

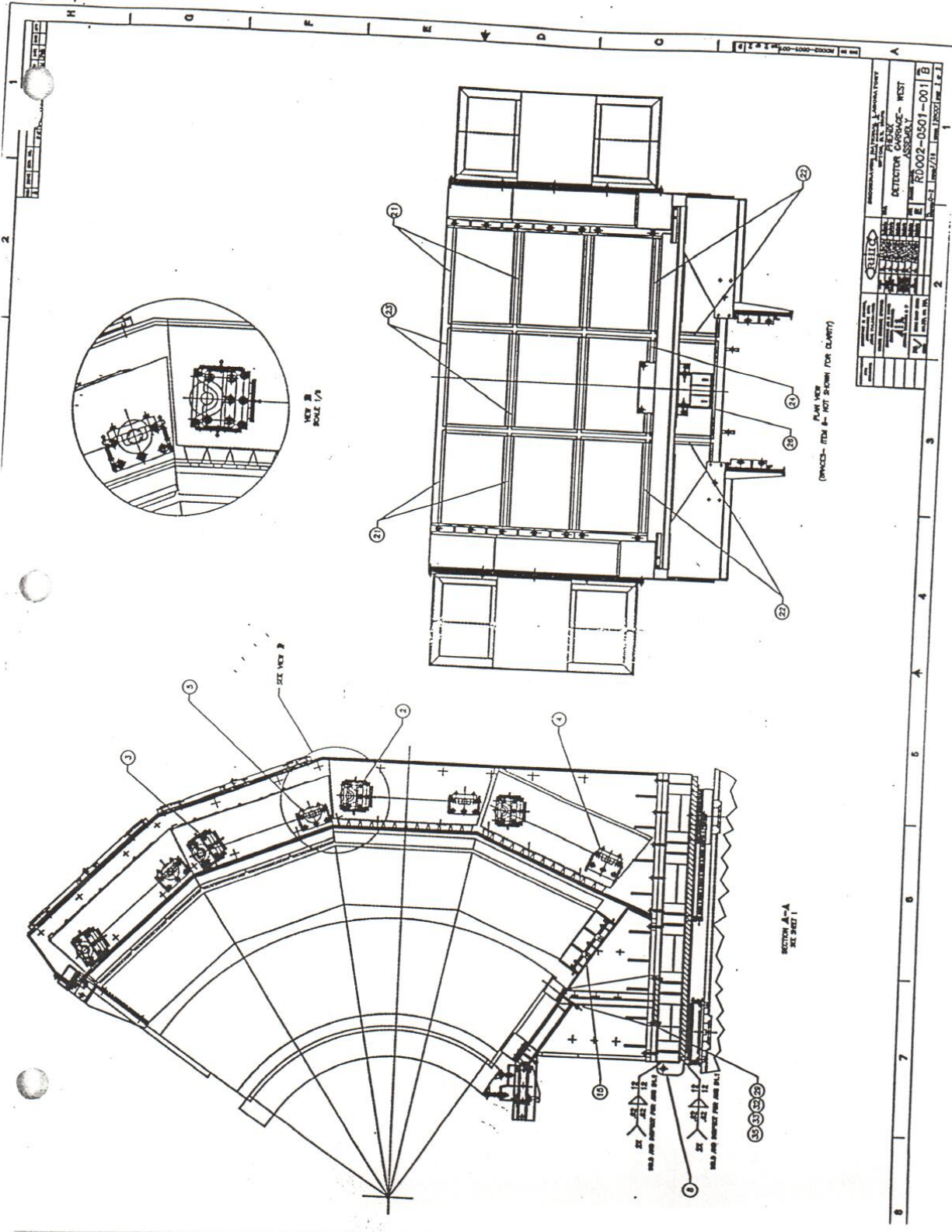
CG LIFT FRAME

REAR MOUNT

CARRIAGE ARM







PROJECT: DETECTION CENTER - WEST DRAWING: RO002-0501-001 B DATE: 1/11/11 DRAWN BY: [Signature] CHECKED BY: [Signature]	
REVISIONS 1. [Description] 2. [Description]	APPROVED BY: [Signature] TITLE: [Title]

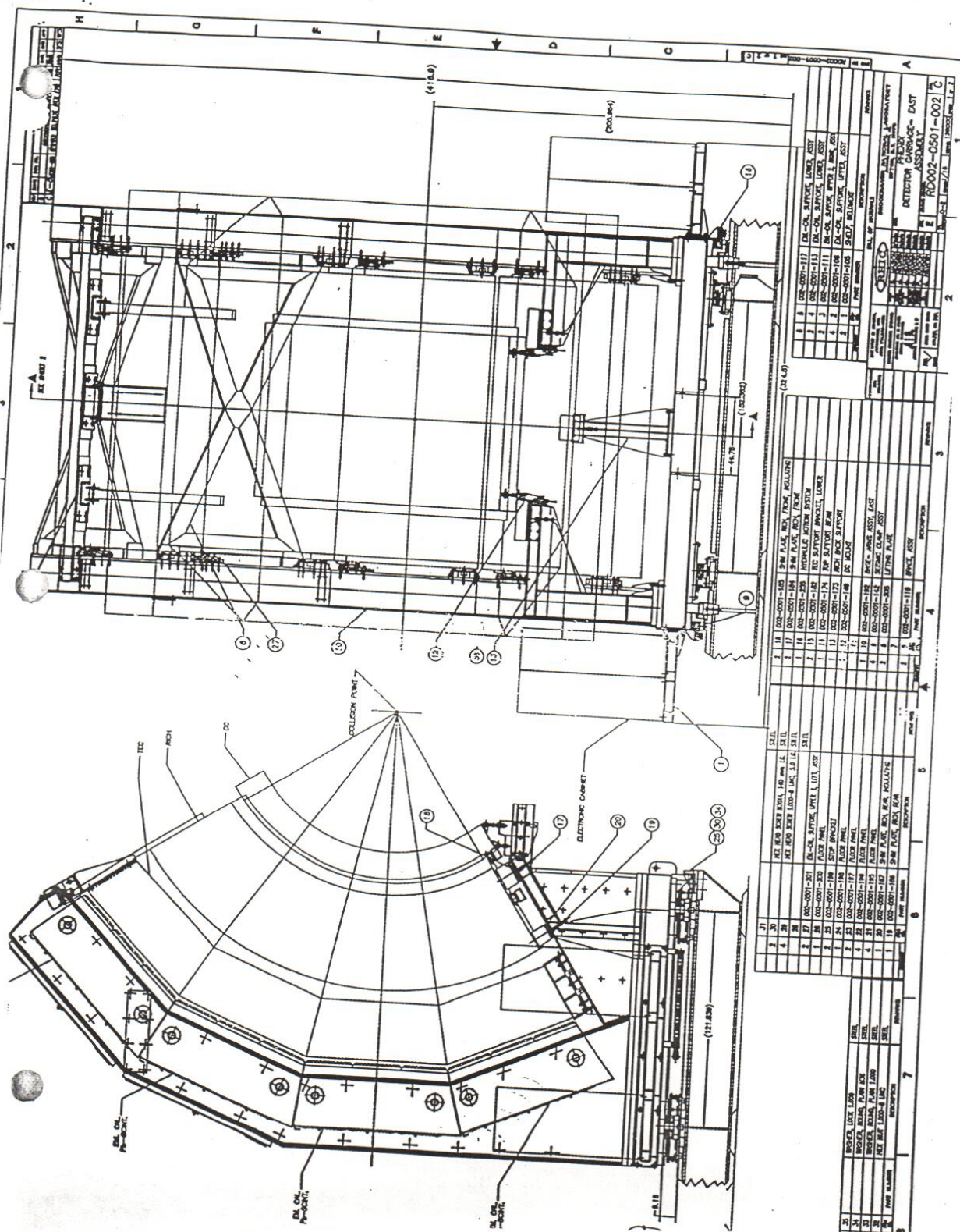
PLAN VIEW  
(WALLS - NOT SHOWN FOR CLARITY)

SECTION A-A  
SEE SHEET 1

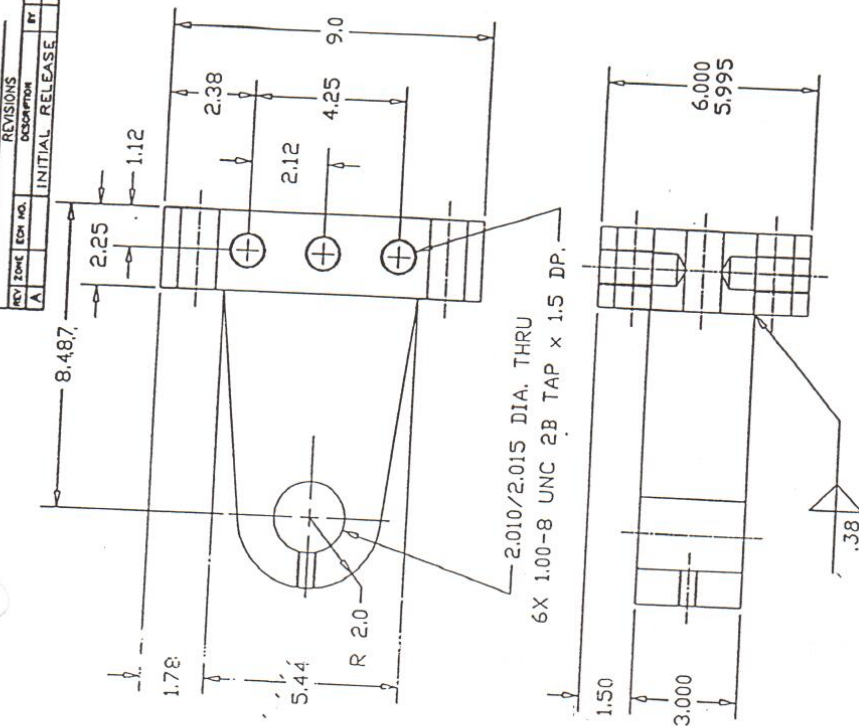
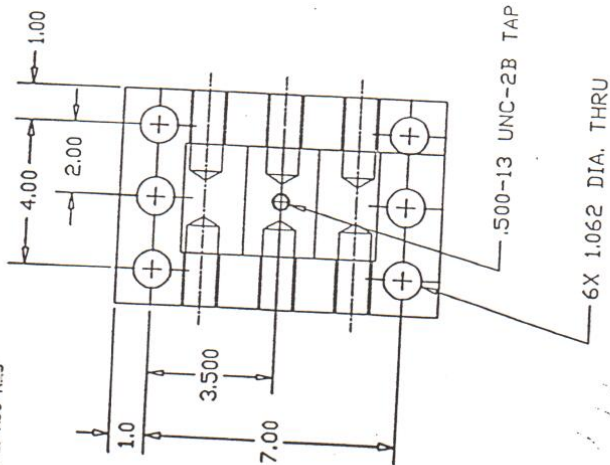
VIEW 2  
SCALE 1/8"

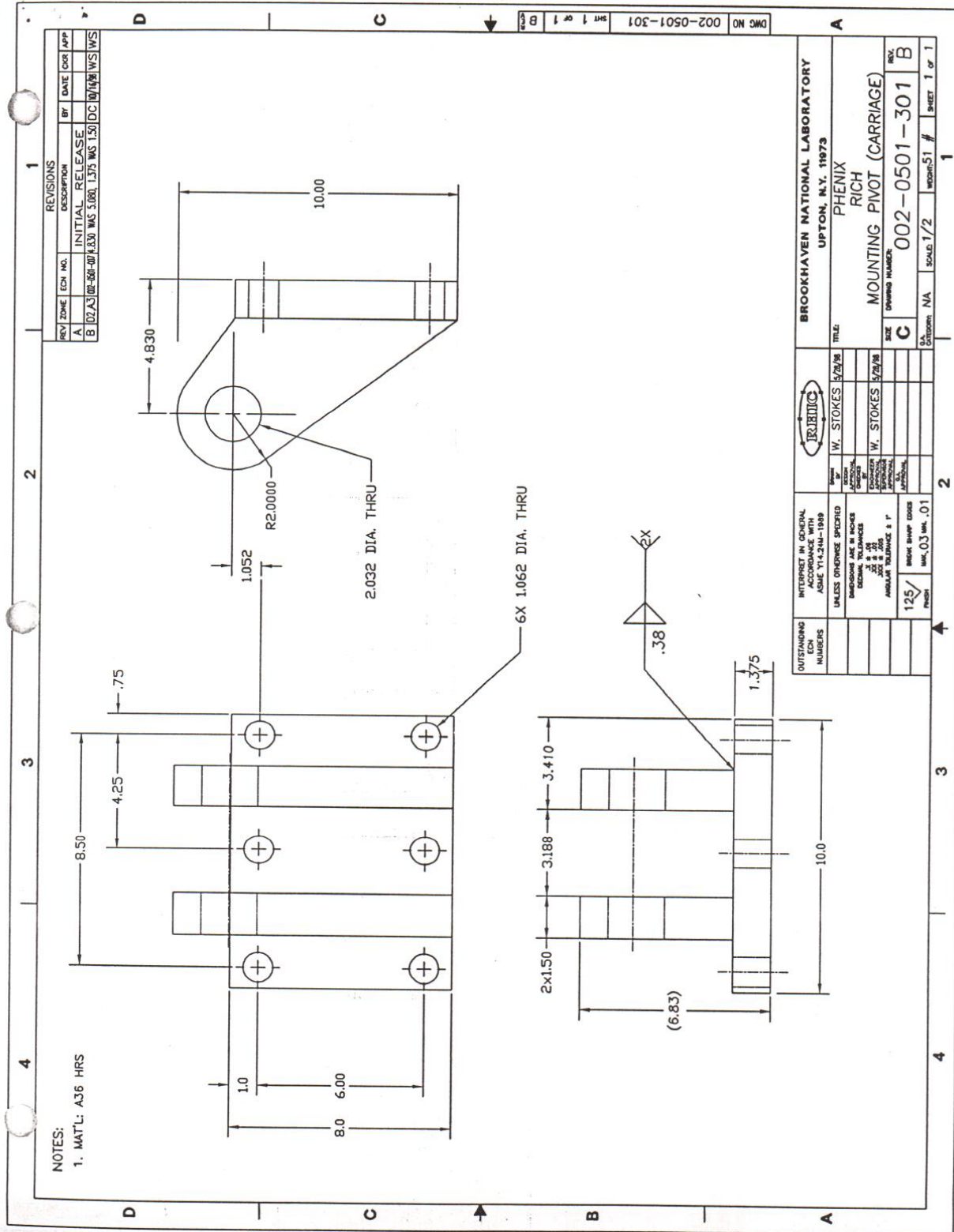
SEE VIEW 2

WALL AND ROOFING PER DETAIL 1  
WALL AND ROOFING PER DETAIL 1



1. MAT'L: A36

[illegible]





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# **RICH Removal from 1008 Attachment for work Permit SDD-2016-005**

**Rob Pisani**

# Truck Prep

This document is for illustration purposes  
to aid in the removal of the RICH detector



Detector needs to be positioned on the on the back of the bed so that it can be reached by the crane at 1008. CA-Riggers will prep a flatbed to receive the detector and transport it to 912.



This document is for illustration purposes to aid in the removal of the RICH detector



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Detectors angle set  
to 32 degrees to fit  
through the roll up  
door



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to aid in the removal of the RICH detector

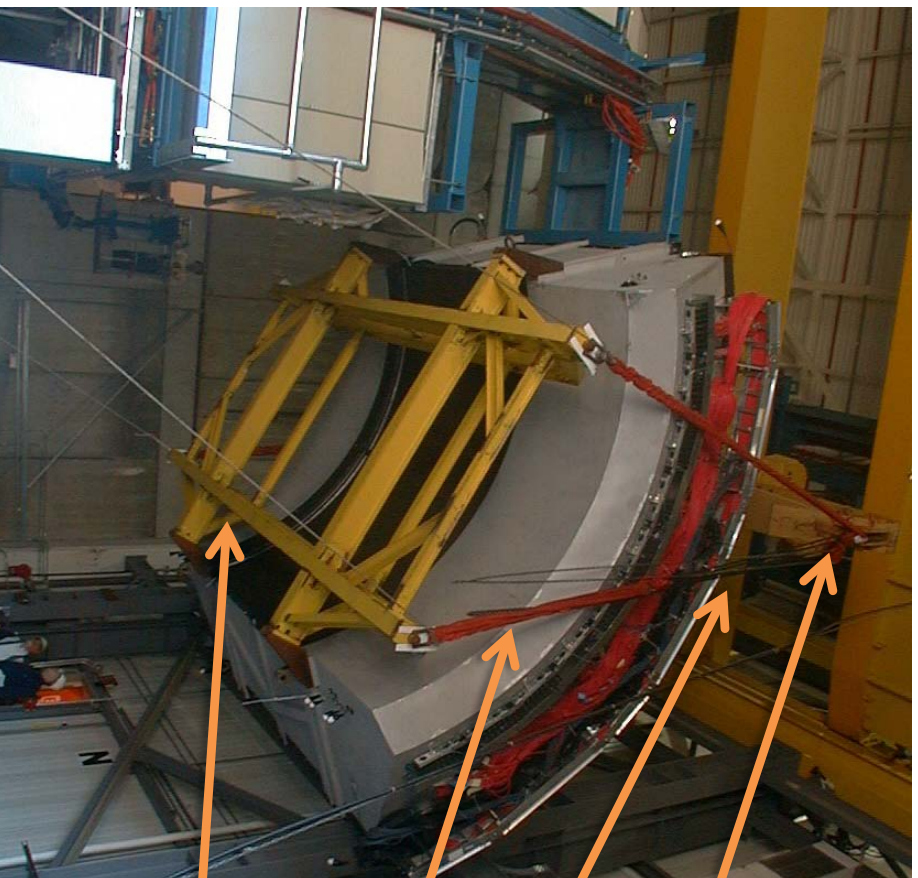
# Detector Removal

This document is for illustration purposes  
to aid in the removal of the RICH detector

## Needed Equipment for lift

### Rich Vessel--- 16500lbs

- Spreader Bar
  - Rating: 13 ton min
  - Use Emcal spreader rated 40 ton
- Chain Fall
  - Four 5 ton, 20 foot min
  - 2 1 ton,
- Slings:
  - 6 10 ton slings, 10 feet long
- Rich Lifting Fixture:
  - Rating: 22,000 lbs
- Four 10 ton swivel shackles
- Two 2.5 ton swivel shackles
- Guide rope—30 feet each



This document is for illustration purposes  
to aid in the removal of the RICH detector



## **RICH Mounted to East Carriage**

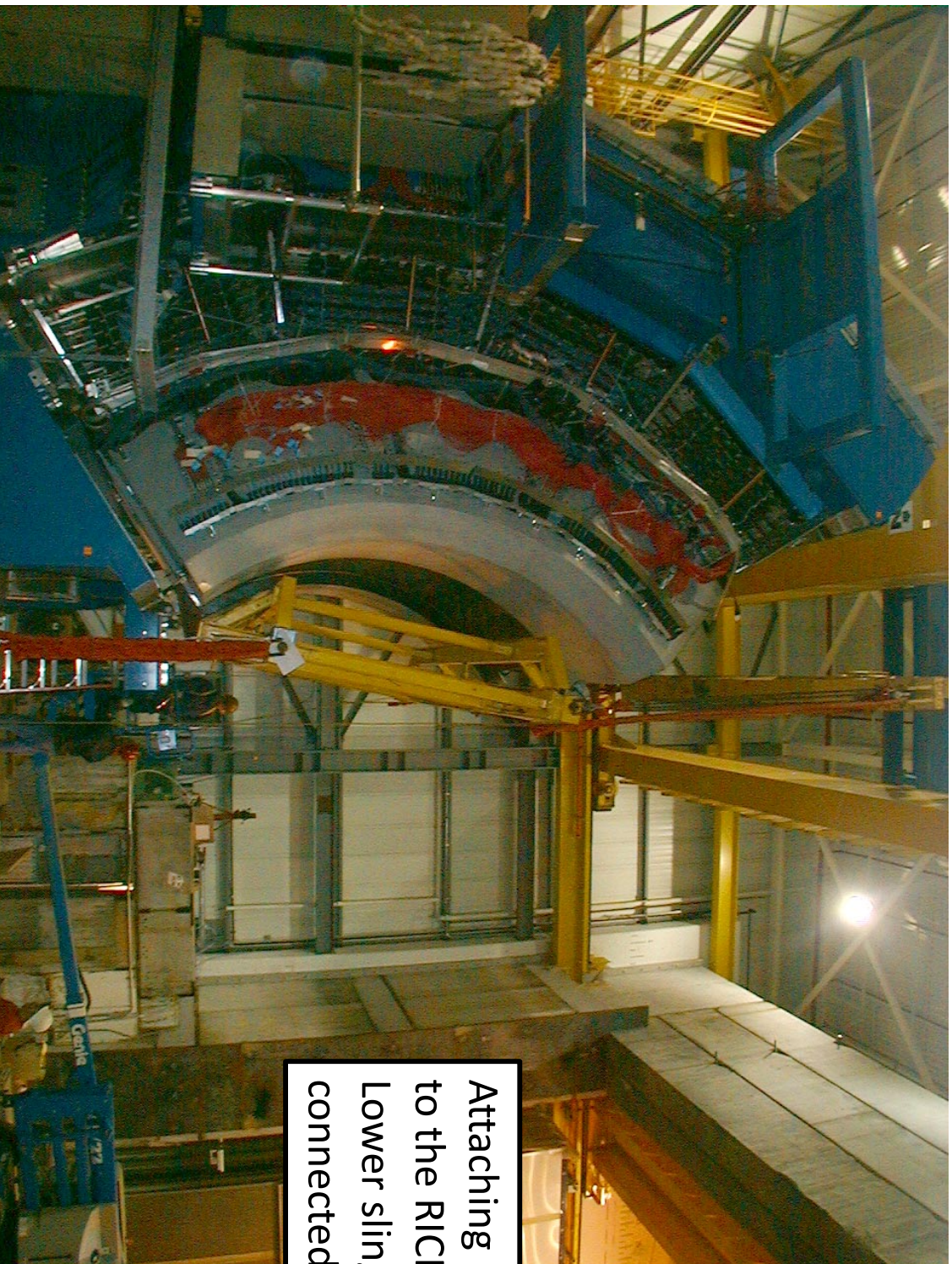
**Disconnect and remove all  
cables, gas, and water lines  
from RICH detector prior to  
removing detector**

**Racks and Platforms for E2  
and E3 should be removed.**



Rigging in RICH lift fixture with Slings and Chain Falls mounted. Note, Chain fall are just hanging from spreader bar to be connected to lower slings later. .

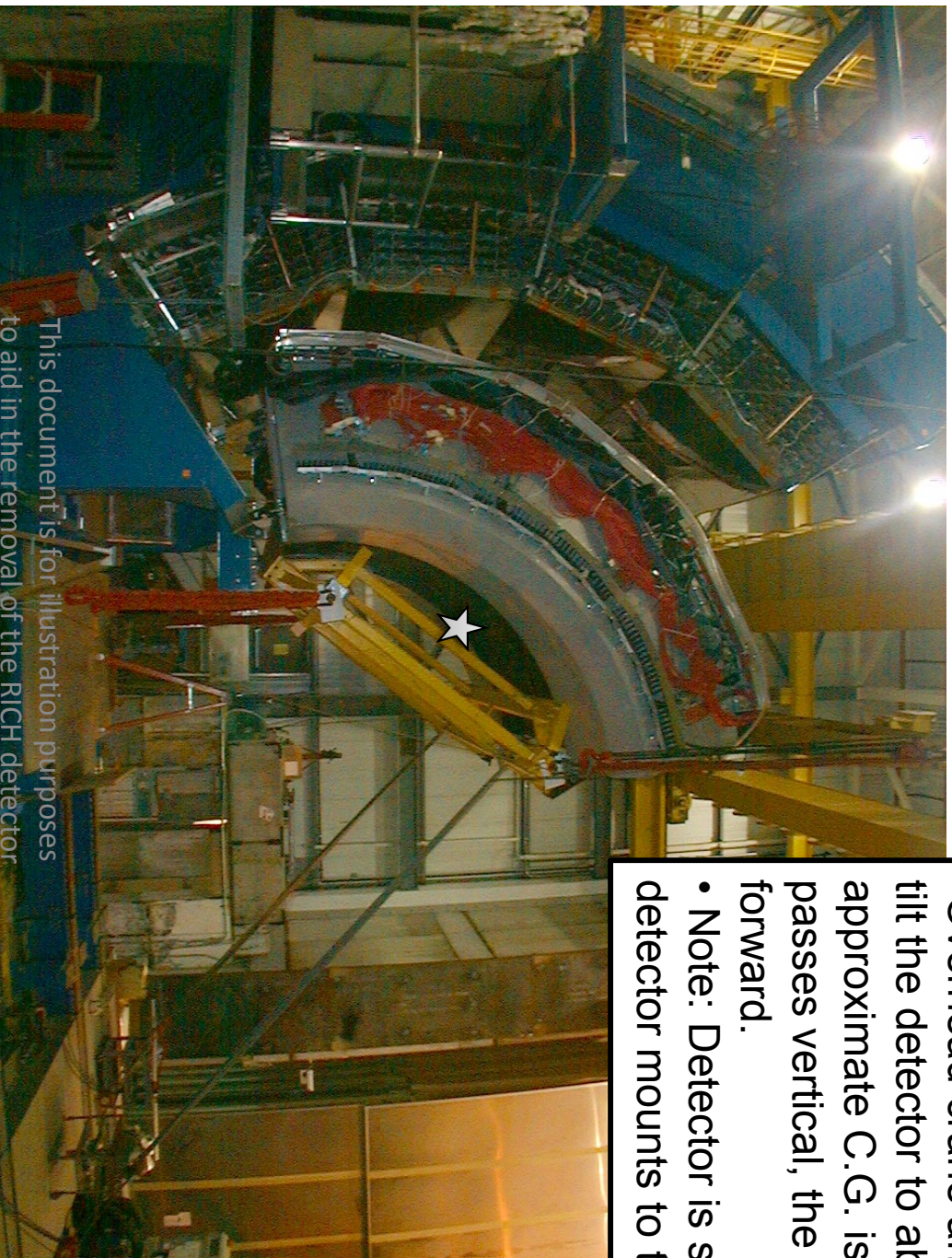
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Attaching RIC fixture  
to the RIC. Note:  
Lower slings are still not  
connected to hook yet

This document is for illustration purposes  
to aid in the removal of the RIC detector

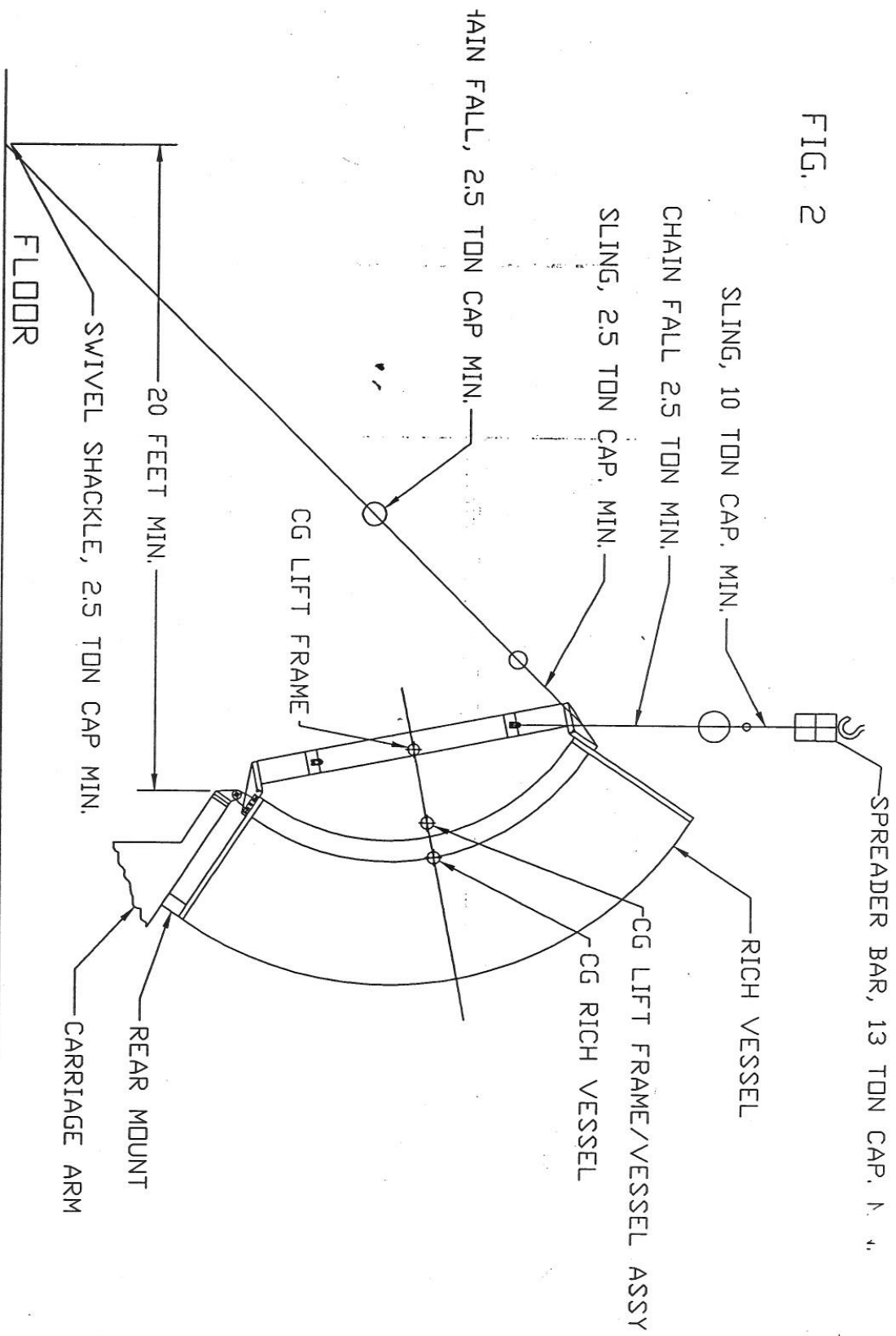
- Attach anchor points (min 20 feet away) and chain fall to upper part of lifting fixture with slings.
- Once all points are attached and overhead slings are made taught, the upper stabilizer bars bolting the RICH to the Carriage are removed are removed.
- Overhead crane and come-alongs are used to tilt the detector to about 30 degrees. The approximate C.G. is marked with a star. Once it passes vertical, the detector will want to swing forward.
- Note: Detector is still attached to its lower detector mounts to the Carriage at this point.



This document is for illustration purposes to aid in the removal of the RICH detector

# Draw for reference

FIG. 2

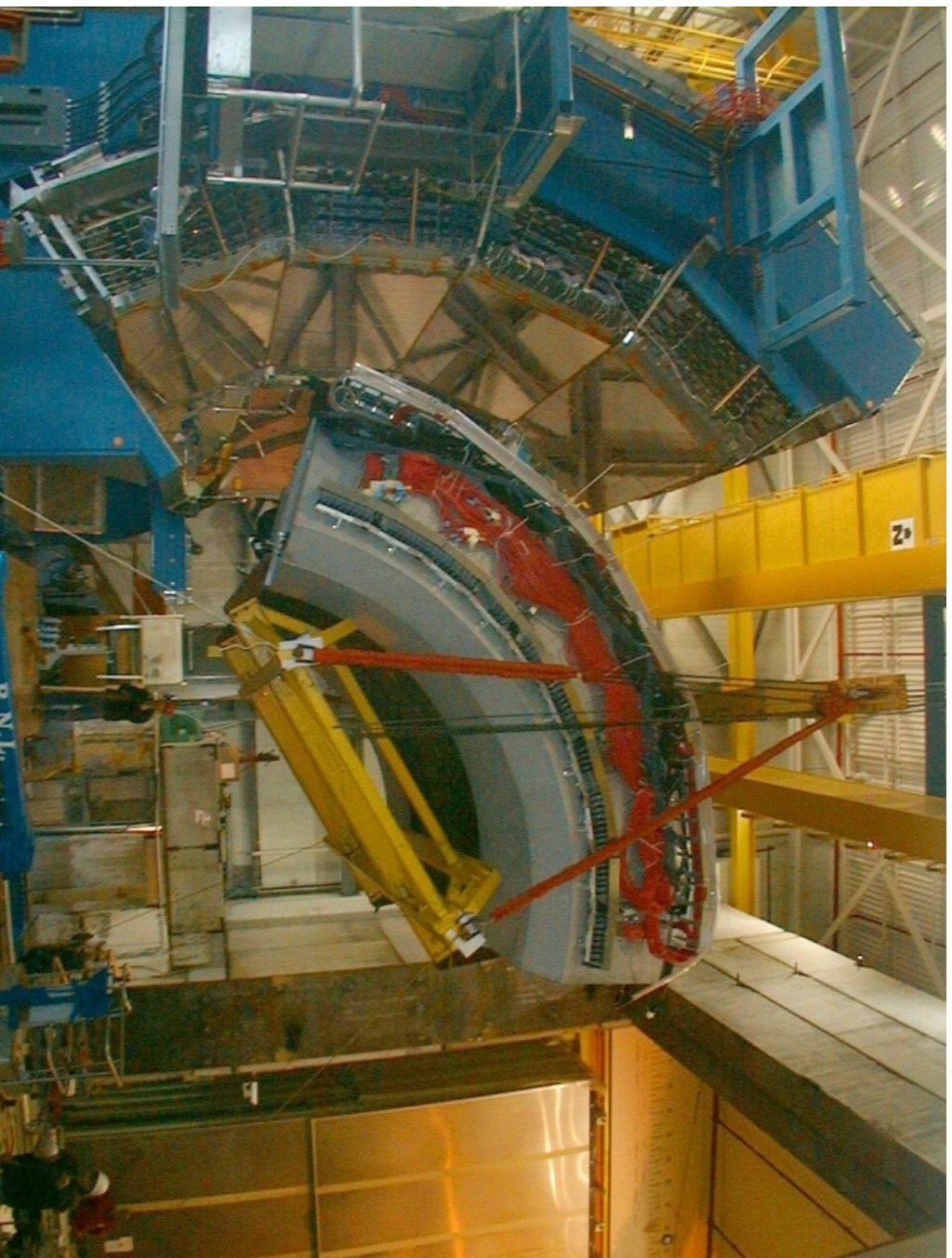


This document is for illustration purposes  
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Once at 30 degrees, attach the chain fall to the lower slings and remove slack. Remove slings from floor anchors. Take weight of detector with the overhead crane and remove lower pivot pins. Detector is ready to fly.

This document is for illustration purposes  
to aid in the removal of the RICH detector

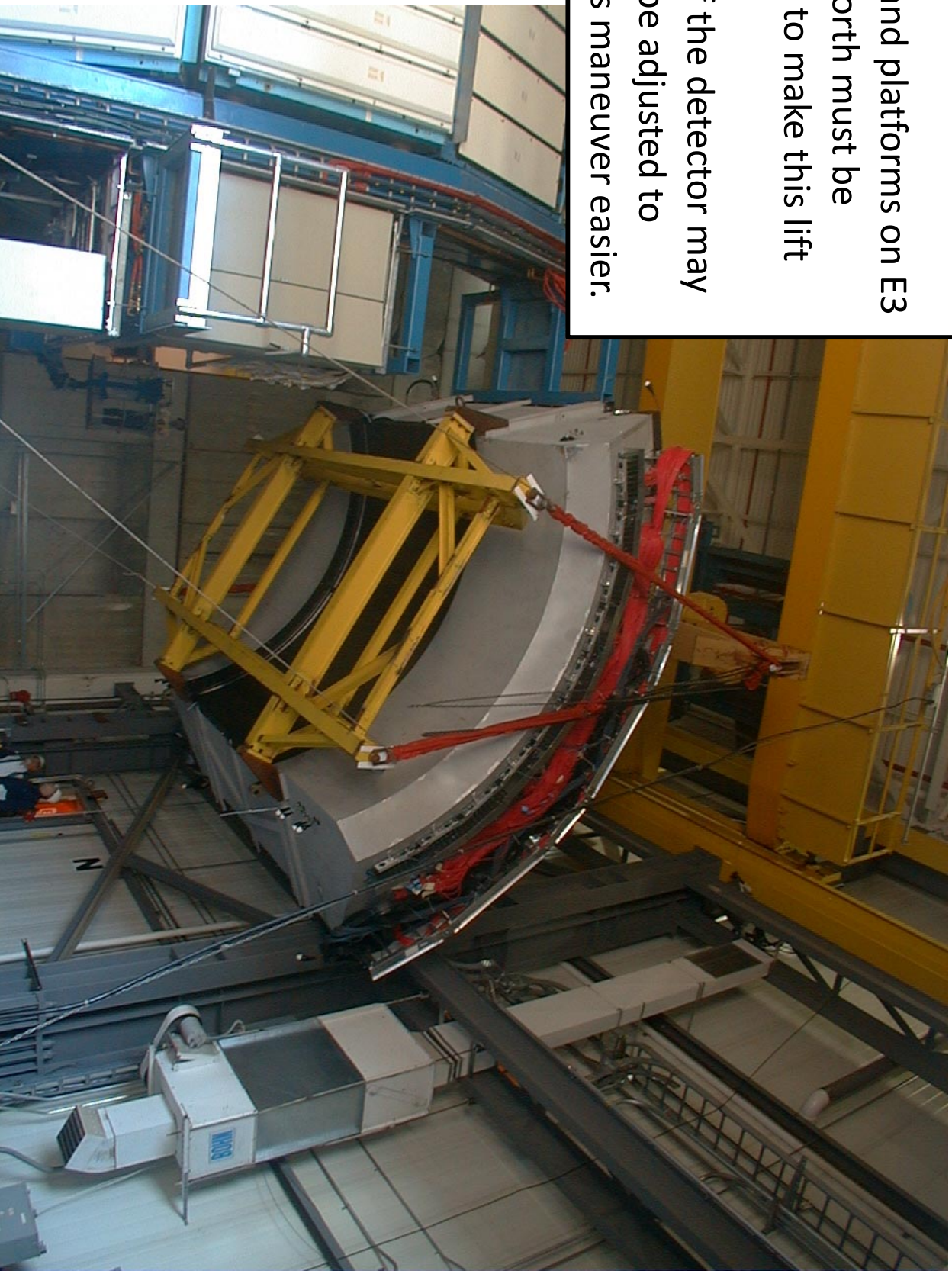


Attach guide ropes to 4 corners to help stabilize detector as it is lifted around the carriage

This document is for illustration purposes to aid in the removal of the RICH detector

## Passing over North Door.

- Racks and platforms on E3 and E2 north must be removed to make this lift easier.
- Angle of the detector may need to be adjusted to make this maneuver easier.



This document is for illustration purposes to aid in the removal of the RICH detector

# Some details for the lift.

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to aid in the removal of the RICH detector

Top of detector. Lifting fixture bracket bolts to flat plate





Lower lifting fixture  
bracket gets bolted to  
the lower pivot bracket  
from the side





Spreader Bar



For the first lift (west detector), they used short lings and attached chain falls to the 4 lifting points



Pins at lower pivot  
points will need to be  
removed

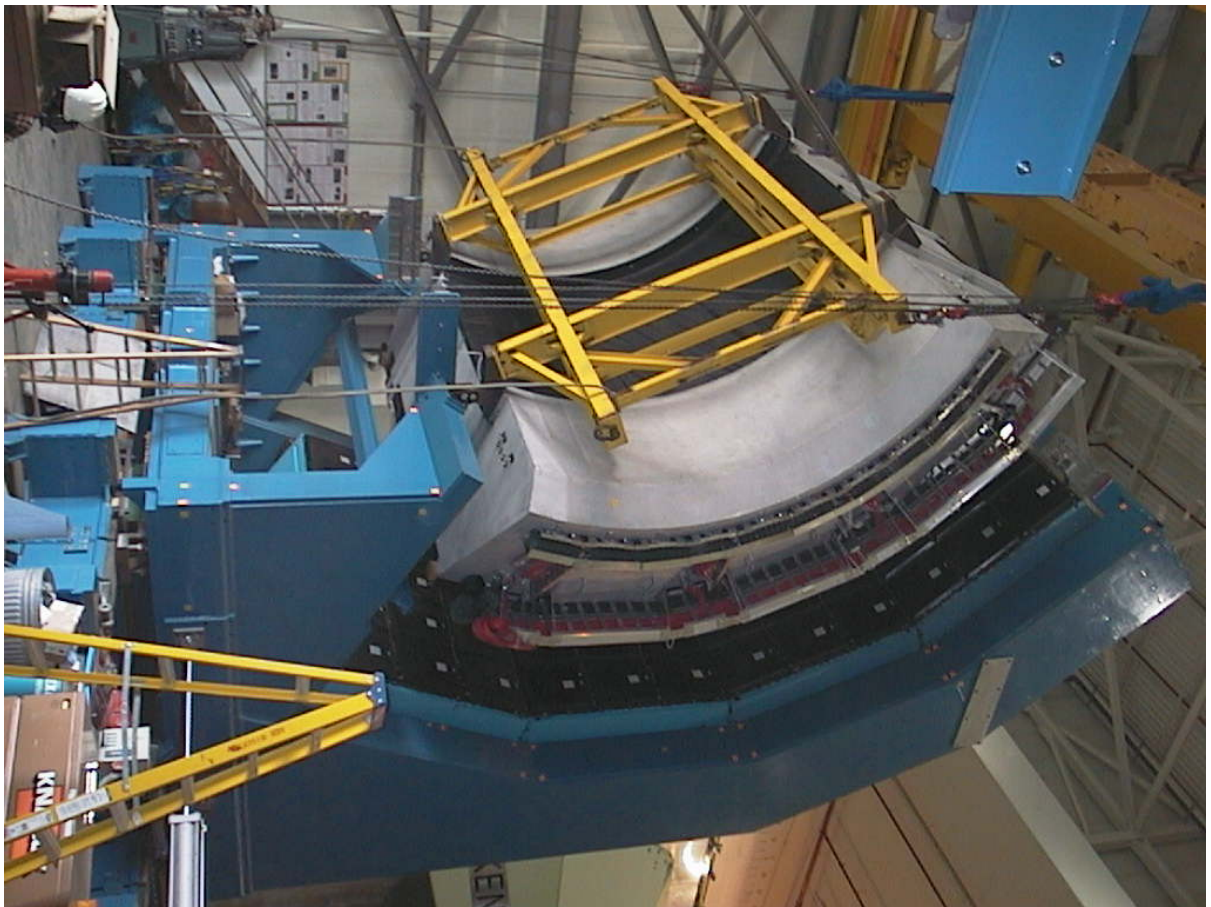


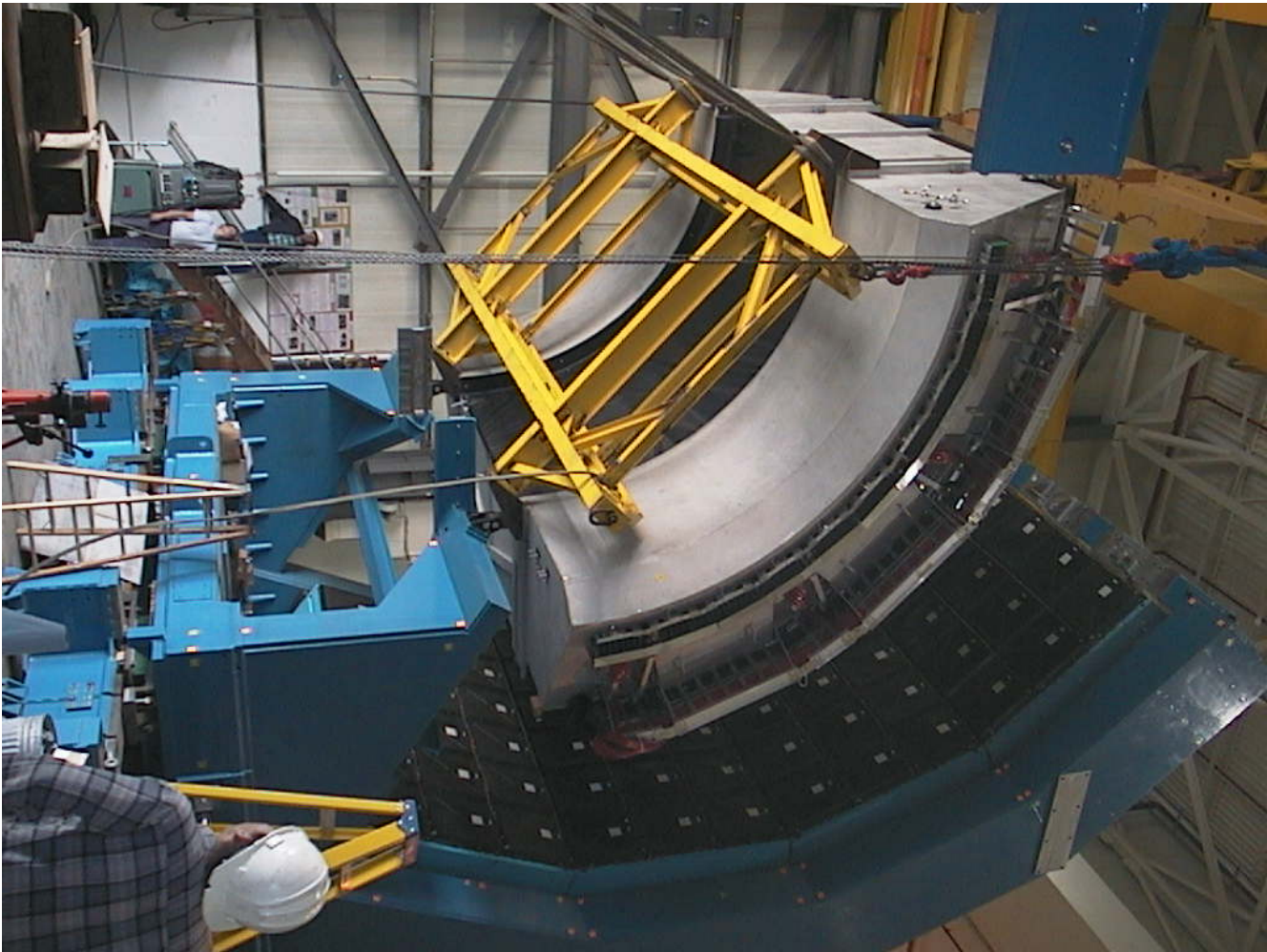
Lower lifting fixture  
bracket gets bolted to  
the lower pivot bracket  
from the side





- Slings for floor anchors
- Lower chain falls hanging from spreader bar
- Guide Ropes











# Extra Photos for Preparing the Truck

This document is for illustration purposes  
to aid in the removal of the RICH detector





